Neural Networks & Deep Learning

ICP-3

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GitHub-

https://github.com/SreejaReddyKonda/Neural-Network-Sreeja/blob/main/Neural%20Networks/ICP-3/ICP-3.ipynb

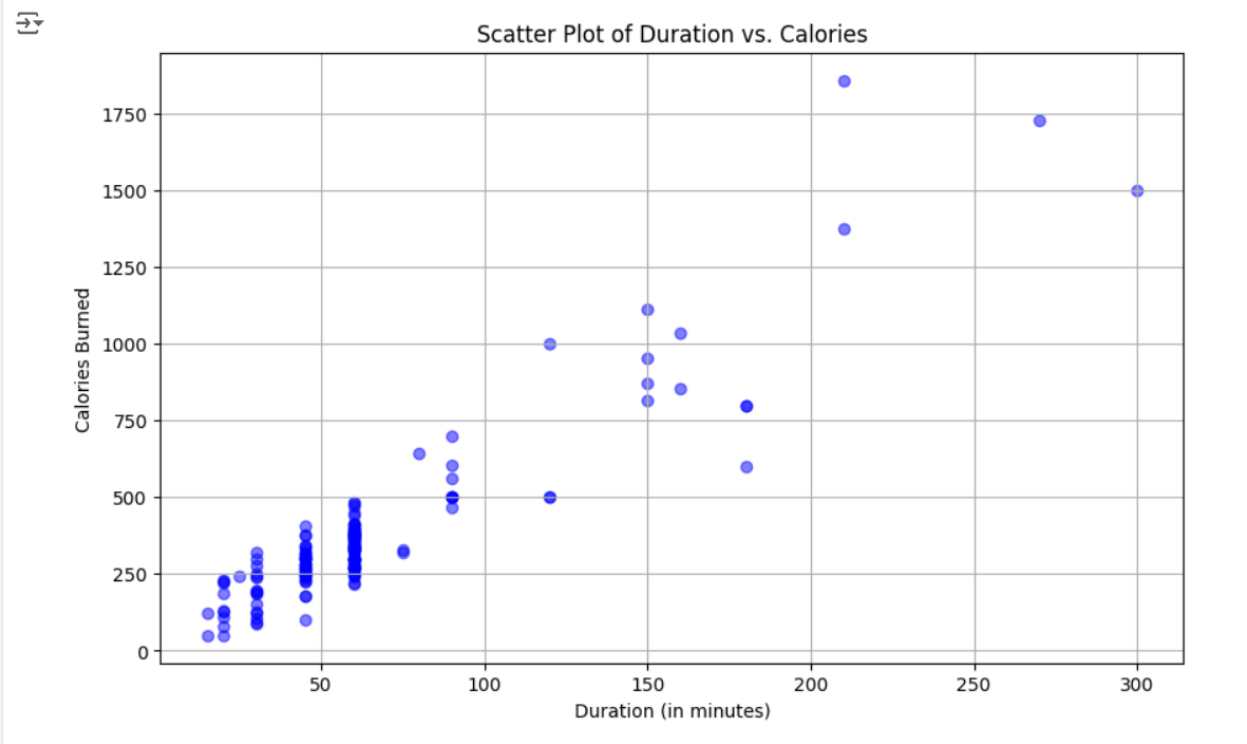
Video-
https://drive.google.com/file/d/17SYCHBzPlq9c2EvkkGtIjTzDKQzkDwGg/view?usp=sharing

1.

```python
import pandas as pd

# Load the CSV file into a DataFrame
df = pd.read_csv('/content/data.csv')

# Display the basic statistical description about the data
basic_stats = df.describe()

# Check if the data has null values
null_values = df.isnull().sum()

# Replace the null values with the mean of their respective column
df_filled = df.fillna(df.mean())

# Aggregating data for at least two columns: min, max, count, mean
selected_columns = df_filled[['Calories', 'Pulse']]  # Example: selecting 'Calories' and 'Pulse'
aggregated_data = selected_columns.agg(['min', 'max', 'count', 'mean'])

# Filter the dataframe for calories values between 500 and 1000
filtered_500_1000 = df_filled[(df_filled['Calories'] >= 500) & (df_filled['Calories'] <= 1000)]

# Filter the dataframe for calories values > 500 and pulse < 100
filtered_calories_pulse = df_filled[(df_filled['Calories'] > 500) & (df_filled['Pulse'] < 100)]

# Creating a new "df_modified" dataframe without the "Maxpulse" column
df_modified = df_filled.drop(columns=['Maxpulse'])

# Deleting the "Maxpulse" column from the main df dataframe
df.drop(columns=['Maxpulse'], inplace=True)

# Convert the datatype of Calories column to int
df['Calories'] = pd.to_numeric(df['Calories'], downcast='integer', errors='coerce')
df['Calories'].fillna(df['Calories'].mean(), inplace=True)  # Re-fill if any NaN introduced by coercion
```

```
basic_stats, null_values, aggregated_data, filtered_500_1000.shape, filtered_calories_pulse.shape, df_modified.head(), df.head()

import matplotlib.pyplot as plt

# Creating a scatter plot for the Duration and Calories columns
plt.figure(figsize=(10, 6))
plt.scatter(df['Duration'], df['Calories'], color='blue', alpha=0.5)
plt.title('Scatter Plot of Duration vs. Calories')
plt.xlabel('Duration (in minutes)')
plt.ylabel('Calories Burned')
plt.grid(True)
plt.show()
```

Output –



Explanation:

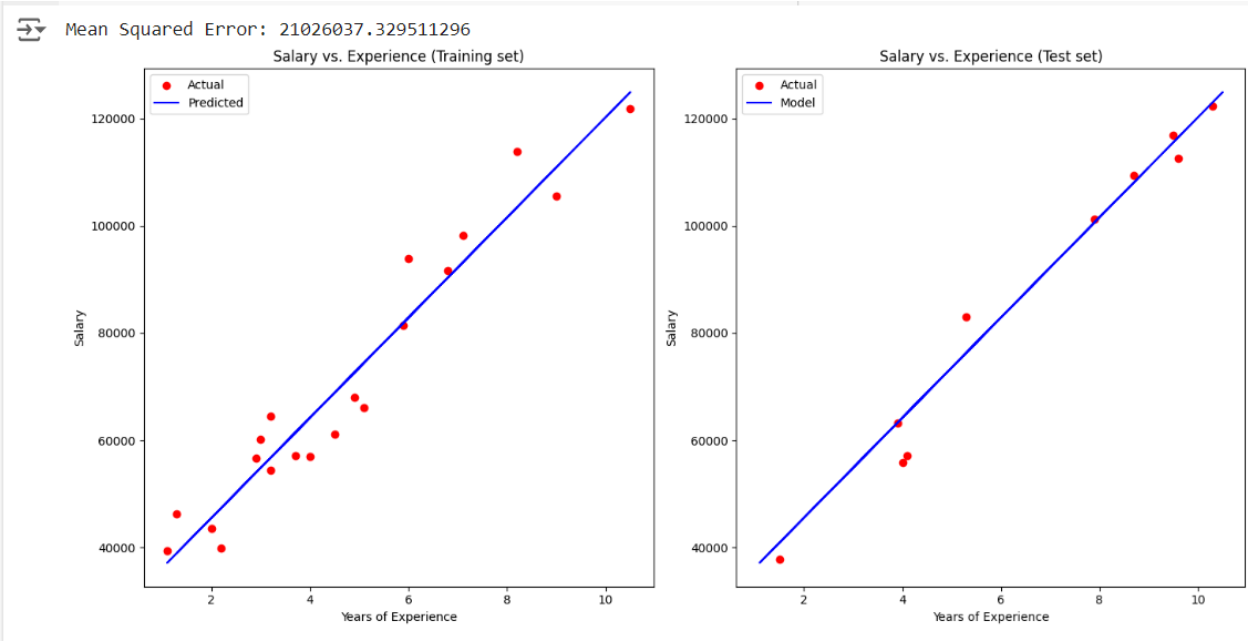
Loading file into a data frame. Then finding all the null values and filling them with mean value and using aggregate functions such as min, max, count, and mean for summarizing the data. Performing 2 filters on the data frame, one for “Calories“ in between 500 and 1000 other one is for “Calories” greater than 500 and “Pulse” less than 100. Dropping max pulse using df_filled.drop. At last convert the calories to integer so that later plotting can be done for duration vs calories.

2.

```python
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error

# Load the dataset
salary_data = pd.read_csv('/content/Salary_Data.csv')

# Splitting the dataset into training and testing sets (1/3 for testing)
X = salary_data.iloc[:, :-1].values  # Features (Years of Experience)
y = salary_data.iloc[:, -1].values   # Target (Salary)
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=1/3, random_state=0)

# Training the Linear Regression model
model = LinearRegression()
model.fit(X_train, y_train)

# Predicting the Test set results
y_pred = model.predict(X_test)

# Calculating the Mean Squared Error
mse = mean_squared_error(y_test, y_pred)
print(f"Mean Squared Error: {mse}")

# Visualizing the Training set results
plt.figure(figsize=(14, 7))

plt.subplot(1, 2, 1)
plt.scatter(X_train, y_train, color='red', label='Actual')
plt.plot(X_train, model.predict(X_train), color='blue', label='Predicted')
plt.title('Salary vs. Experience (Training set)')
plt.xlabel('Years of Experience')
plt.ylabel('Salary')
plt.legend()
```

```python
# Visualizing the Test set results
plt.subplot(1, 2, 2)
plt.scatter(X_test, y_test, color='red', label='Actual')
plt.plot(X_train, model.predict(X_train), color='blue', label='Model')
plt.title('Salary vs. Experience (Test set)')
plt.xlabel('Years of Experience')
plt.ylabel('Salary')
plt.legend()

plt.tight_layout()
plt.show()
```

Output:



Explanation:

Loaded all data set and split all data into 2 sets representing training and testing sets. Training the linear regression model and predicting the test set results. Then calculating the MSE and visualizing the test set results and displaying the visualization using plt.tight_layout(), plt.show().